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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/708,042	02/04/2004	Di-Jia Liu	19441-0058	2041
29052 7590 06/20/2008 SUTHERLAND ASBILL & BRENNAN LLP 999 PEACHTREE STREET, N.E. ATLANTA, GA 30309				
EXAMINER				
DOVE, TRACY MAE				
ART UNIT		PAPER NUMBER		
1795				
MAIL DATE		DELIVERY MODE		
06/20/2008		PAPER		

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

### Office Action Summary

**Application No.**

10/708,042

**Applicant(s)**

LIU ET AL.

**Examiner**

TRACY DOVE

**Art Unit**

1795

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☒ Responsive to communication(s) filed on 14 March 2008.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 1, 3 and 5-20 is/are pending in the application.
- 4a) Of the above claim(s) 13-20 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1, 3, 5-12 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-8508)  
Paper No(s)/Mail Date \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_\_

### DETAILED ACTION

This Office Action is in response to the communication filed on 3/14/08. Applicant's arguments have been considered, but are not persuasive. Claims 1, 3 and 5-20 are pending.

Claims 13-20 are withdrawn from consideration.

#### *Claim Rejections - 35 USC § 103*

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1, 3 and 6-12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Baker et al., US 4,182,795 in view of Paz, US 2005/0053819.

Baker teaches a solid oxide fuel cell (3:1-25) having an anode 114, a cathode 112 and an electrolyte layer 116 there between. Separator plate 118 has passages for supplying process gas to the cathode and separator plate 120 has passages for supplying fuel gas to the anode (Figure 5). The separator plate 120 includes a catalyst coating 121 for hydrocarbon reforming (7:42-65). As shown in Figure 5, neither the portion of separator 120 that contacts the anode 114 nor the base of the separator contains catalyst 121. Wherein the hydrocarbon content is methane, a suitable steam-reforming catalyst is nickel or nickel based (transition metal) (6:67-7:8).

Baker does not explicitly state the interconnect substrate is formed of high temperature stainless steel/alloy plate (claim 3), the solid oxide electrolyte comprises yttria-stabilized zirconia (claim 12) or the catalyst coating comprises a catalyst support and/or catalyst promotor (claim 10) in addition to the steam reforming catalyst disclosed by Baker.

However, Paz teaches the use of an internal fuel reforming catalyst coating on an interconnect that connects individual solid oxide fuel cells. The catalyst coating enhances the rate of internal fuel reformation and improves the thermal efficiency of the fuel cell (0002). As shown in Figure 1, the interconnects sandwich the cathode/electrolyte/anode solid oxide fuel cell structure. The interconnects have flow field channels for the fuel gas and the oxidant gas. The catalyst coating is in fluid communication with the hydrocarbon fuel and preferably includes a base metal and a precious metal (0016). The fuel reformation catalyst is applied to a portion of the surface of the interconnect opposite the anode of the fuel cell or to a portion of the interconnect that is in communication with the fuel provided to the anode (0034). The interconnect is preferably a metallic or ceramic material having the desired shape to effect the interconnection, depending on the type of SOFC prepared. The metallic interconnect may be made from ferritic stainless steel (0054). Additionally,  $\text{CeO}_2$  may be used with the precious metal to further improve catalysis.  $\text{Al}_2\text{O}_3$  or  $\text{ZrO}_2$  may be used as a catalyst support material (0031). The solid electrolyte may be yttria-stabilized zirconia (YSZ) (0044).

Therefore, the invention as a whole would have been obvious to one having ordinary skill in the art at the time the invention was made because one of skill would have been motivated to use common materials known in the art for the interconnect substrate, solid electrolyte and catalyst coating. Furthermore, Paz teaches the catalyst coating enhances the rate of internal fuel reformation and improves the thermal efficiency of the fuel cell (0002). Baker teaches a solid oxide fuel cell. Yttria-stabilized zirconia (YSZ) is one of the most common solid electrolyte materials employed in solid oxide fuel cells. Both Baker and Paz are directed toward solid oxide

fuel cells and one of skill would have found it obvious to use the materials of the solid oxide fuel cell of Paz for the materials of the solid oxide fuel cell of Baker.

\*

Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Baker et al., US 4,182,795 in view of Paz, US 2005/0053819 and further in view of Fujiwara et al., JP 06-068887. See discussion of Baker and Paz above regarding claim 1.

Baker does not explicitly teach the anodic interconnect includes a plurality of rows of fins wherein adjacent rows are offset from one another. However, Fujiwara teaches a separator for a fuel cell comprising a corrugated material, which is continuously bent into a U-shape, and which is offset at a fixed length, is used for the interconnect of the anode side of the fuel cell (abstract). Therefore, the invention as a whole would have been obvious to one having ordinary skill in the art at the time the invention was made because one of skill would have been motivated to use the known fuel cell interconnect structure of Fujiwara for the fuel cell interconnect structure of Baker. The interconnect structure of Fujiwara provides a large surface area, reduces contact resistance with the anode, can be used at a high surface pressure and allows for control of pressure loss (abstract).

#### ***Response to Arguments***

Applicant's arguments filed 3/14/08 have been fully considered but they are not persuasive.

Applicant argues the cited references fail to disclose the last six lines of pending claim 1 and that the Examiner's position is based upon an erroneous interpretation of Figure 5 of Baker. Applicant asserts Examiner's interpretation that "neither the portion of separator 120 that

contacts the anode 114 nor the base of the separator contains catalyst” directly contradicts the disclosure accompanying Figure 5 as well as the teachings of Baker when the reference is considered as a whole. It is unclear how Applicant reaches this conclusion. Figure 5 clearly shows “neither the portion of separator 120 that contacts the anode 114 nor the base of the separator contains catalyst”. In Figure 5, the “first uncoated portion” is shown as crest 120d wherein “the portion” electrically connected to the anode 114 is not coated, the “second uncoated portion” is shown as the base of the substrate contacting plate 120f wherein “the portion” connected to the anodic current collector (120f) is not coated, and the “spacing portion” is shown as wall 120c or 120e that extends between the first and second uncoated portions and is part of the passage forming space 120a for fuel gas flow.

Applicant argues Baker does disclose that electrolyte-isolated passages 120b may include catalyst coatings, however, Baker expressly teaches that catalyst should not be applied in passages which are not electrolyte-isolated. The argument is not commensurate in scope with the claimed invention because the present claims do not require catalyst be contained in the fuel gas flow passages. The claims only require “a catalytic coating on the metallic substrate comprising a catalyst for catalytic conversion of a hydrocarbon fuel in the fuel gas to a hydrogen rich reformat”. Baker teaches the separator plate 120 includes a catalyst coating 121 for hydrocarbon reforming (7:42-65). Wherein the hydrocarbon content is methane, a suitable steam-reforming catalyst is nickel or nickel based (transition metal) (6:67-7:8).

### ***Conclusion***

**THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Tracy Dove whose telephone number is 571-272-1285. The examiner can normally be reached on Monday-Thursday (9:00-7:30).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Pat Ryan can be reached on 571-272-1292. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

/Tracy Dove/  
Primary Examiner, Art Unit 1795  
June 17, 2008

